# Physical activity, obesity, and educational attainment in 50- to 70-year-old adults

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ORIGINAL ARTICLE

# Physical activity, obesity, and educational attainment in 50- to 70-year-old adults

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**Abstract**
*Aim* The purpose of the study is to investigate, in subpopulations with varying levels of education, firstly, the extent to which older adults with an otherwise sedentary lifestyle perform simple everyday physical activities such as cycling for transport or taking a walk, and the extent to which older adults perform everyday physical activities in addition to exercise; and secondly, to explore correlations between physical activity and obesity.
*Methods* The study is based on a representative, Baden-Württemberg State Foundation-funded study in 50- to 70-year-old residents of Baden-Württemberg ($n$=2,002).
*Results* Subjects who say they ride a bike for transport or take a walk are significantly more likely to exercise than subjects who do not walk or cycle regularly. This holds even after controlling for sociodemographic and lifestyle-relevant variables. However, the correlation between walking and exercise, and the positive correlation between walking and obesity, is retained only for subjects with a low level of education. Both for subjects with a low level of education and for subjects with a high level of education, multivariate analysis discloses a negative correlation between regular cycling and obesity.
*Conclusions* People who do not exercise regularly are also less active on a day-to-day basis and are less likely to take a walk or ride a bike for transport. Given the health-preserving effects attributed to leisure-time physical activity from a biological and medical point of view, it is particularly important to encourage older adults and disadvantaged sectors of the population to be more physically active.

**Keywords** Epidemiology · Socioeconomic factors · Telephone interview · Physical activity · Obesity

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## Background

Middle-aged and older adults take comparatively little exercise, as research shows (Allender et al. 2006; Becker and Schneider 2005; Boutelle et al. 2000; Lamprecht and Stamm 1998; Mensink et al. 1997; Rütten et al. 2005; Schneider and Becker 2005; Sternfeld et al. 1999). It is of interest to establish whether older adults replace exercising with everyday physical activity such as riding a bike for transport or taking a walk, or whether those who exercise regularly are also more likely to be more active in their everyday lives.

On the basis of the negative correlation between obesity and exercise reported for industrialized countries (Boutelle et al. 2000; Chen and Mao 2006; Mensink 1997; Sullivan et al. 2005; Vatten et al. 2006; Villegas et al. 2006), this study will also explore whether a negative correlation exists between everyday physical activity and obesity. A longitudinal study in Finland shows that men with high everyday activity levels (exercise and general physical activity combined) have a lower body mass index (BMI) than individuals with low levels of overall physical activity (Sulander and Uutela 2007). Given that obesity is a medical risk factor for numerous chronic orthopedic and cardiovascular diseases (Augestad et al. 2004; Cosman 2005; Hu et al. 2006; Lampert et al. 2005; Mayer et al. 2003; Wannamethee and Shaper 2001), this inadequately investigated correlation may be an important factor in terms of health policy-making for

disease prevention. There is abundant evidence in the literature that individuals with a low level of education take less exercise (Crespo et al. 1999; Erlinghagen 2003; Lampert et al. 2005; Sternfeld et al. 1999), are more likely to be obese (Hachfort 1995; Lampert et al. 2005; Mensink 2002), and have a higher overall risk of morbidity and mortality (Helmert et al. 2000; Mielck 2000). Obesity is associated with a large number of health problems in older adults in particular (Sui et al. 2007). Educational attainment impacts health behavior from an early age. Children whose parents have higher educational attainment have a healthier lifestyle through adulthood and are less likely to be obese than children whose parents have lower educational attainment (Wadsworthx 1997).

Exercise levels decline with increasing age, and conversely, the proportion of obese individuals increases steeply in the older population (Sui et al. 2007). Obesity in adulthood correlates positively with cardiovascular morbidity and mortality (Oppert et al. 2006; Sui et al. 2007). However, Sui et al. (2007) also demonstrated that individuals with a BMI of 30 or higher with a good level of fitness have a lower mortality rate than normal-weight individuals with a poor level of fitness (Sui et al. 2007). This paper looks at the impact of physical activity and correlations between physical activity and obesity against the backdrop of educational attainment.

Accordingly, this paper investigates (1) correlations between everyday physical activity (walking, cycling for transport) and exercise, (2) correlations between everyday physical activity (walking, cycling for transport) and obesity, and (3) these correlations versus educational attainment.

## Method

### Study population and data generation

The empirical basis of this study is composed of data from the Baden-Württemberg State Foundation-funded study "Living an active life—age and aging in Baden-Württemberg." This cross-sectional study provides representative, recent, and retrospective data on health, activity, and lifestyle in the population of 50 to 70 year olds.

A total of 2,002 subjects from the target population were surveyed by computer-assisted telephone interview (CATI) in the period from May to October 2006. The telephone sample for the data survey was drawn on the basis of the Gabler-Häder method (Gabler and Häder 1997). To ensure the representativeness of the study for the 50- to 70-year-old Baden-Württemberg population, the data set was weighted prior to the performance of statistical analysis according to variables of age, gender, and education on the basis of the 2004 Microcensus. The survey response rate was 21.23% (see Becker et al. 2007).[1] The fact that the data survey coincided with the soccer World Cup in Germany may have increased the nonresponse rate. It is likely that the response rate during this specific period was additionally impaired by the fact that many of the persons called stopped the discussion immediately and/or were unwilling to provide information on the presence of target persons in the household. In such cases, because of the lack of information on possible target persons among household members, these numbers had to be classified (erroneously, in some cases) as systematic noncoverage, which in turn may be a partial explanation for the low response rate.[2]

### Operationalizations

#### *Dependent variables*

Subjects who said they exercised at least once a week were defined as exercisers and compared with those who said they exercised less than once a week. Weekly exercise is the limit above which leisure-time physical activity starts to have a sustained health benefit.[3] In addition, the more often leisure-time physical activities are performed, the more likely it is that exercise is a lifestyle element, and, for the available data, a minimum exercise frequency of once weekly is the most effective basis for analysis.

The second dependent variable, obesity, is based on the WHO definition. Accordingly, all respondents with a BMI of at least 30 were defined as obese and were compared with respondents with a BMI below 30.

[1] There is no uniform definition for calculating response rate (Schnell 1997: 19). In general, when calculating response rates, a distinction is made between sample-neutral and non-sample-neutral noncoverage. In this study, neutral noncoverage was defined as all instances of noncoverage where contact was not established despite achieving the maximum number of calls. Households with no 50- to 70-year-old target persons, households where the target person does not speak German, households with a non-Baden Württemberg phone number, and numbers used for technical purposes only (fax, modem) were classified as neutral noncoverage. Refusals and discontinuations were counted as systematic noncoverage.

[2] This problem does not apply to the same extent for surveys among the general over-18 residential population, because even if the phone call is terminated immediately by the contact person, it can be assumed that a target person belongs to the household and the noncoverage is systematic in nature.

[3] Although additional physical activity of any frequency may have health benefits (cf. Blair and Conelly 1996), more recent recommendations point to a higher cutoff point for frequency and intensity. For example, a Robert Koch Institute recommendation states: "A half hour of exercise at least 3 days a week has demonstrably positive effects on health" (Mensink 2003: 6).

*Independent variables*

Two everyday physical activities — taking a walk and riding a bike for transport — were included in the analyses as independent variables. These everyday activities were queried using a dichotomous variable: "The next part is about riding a bike for transport, for example, to get the groceries, go to work, or a similar activity. Did you perform this activity on a regular basis within the past 12 months?" or "The next part is about taking a walk at a leisurely pace. Did you perform this activity on a regular basis within the past 12 months?" "Regularly" was defined as at least once a week.

*Control variables*

Overall health was queried by self-assessment on a scale from 1 (very good) to 5 (very poor) and subsumed into three categories ("good," "moderate," and "poor") for analysis purposes.

Diseases and risk factors were queried by asking subjects "Did you ever have any of the following diseases diagnosed by a doctor?" Medical risk factors including hypertension, hypercholesterolemia, and diabetes were defined according to WHO criteria and controlled for in the analyses performed.

Current tobacco use was defined according to the categories of "smoker" (daily and occasional) and "non-smoker." Alcohol consumption was recorded on the basis of g/day and subsumed into the categories "low" (0–5 g/day), "moderate" (5–30 g/day), and "high" (>30 g/day).

Operationalization of eating habits was done by the typology proposed by Reime at al. (1998). Healthy eating was defined as daily consumption of whole grain bread, fruit, vegetables, and fish and non-daily consumption of meat, deep-fried foods, white bread, and confectionery. Subjects with three of these eight eating habits were rated as having an unhealthy diet, subjects with four or five of the eight were classified as having a moderately healthy diet, and subjects reporting more than six of the eight qualified as having a healthy diet.

Sociodemographic and socioeconomic variables were surveyed using a standardized questionnaire (Working Committee of the German Institutes for Marketing and Social Research et al. 2004) and likewise factored into the study as control variables.

*Statistical design*

The effects of everyday cycling/walking and of the control variables both on exercise and on obesity were determined bivariately, depending on scale level, by $\chi^2$ test or unpaired *t*-test. Significant bivariate test results were followed by logistical regression to investigate the effects of cycling or walking on exercise and on obesity, whilst controlling for relevant covariates. The intention was to make the procedure as economical as possible in terms of the number of variables, by excluding from the multivariate analysis all variables and control variables found to be nonsignificant in the bivariate analysis. The purpose was to explore the extent to which cycling for transport or walking are in themselves determinants for the dependent variables, or whether individual associations disappear when other variables are factored in and held constant. Multiple regression models were calculated for the various correlations to be investigated. The overall model reported investigates the effects of the respective predictors on the dependent variable while including all the control variables that were significant in bivariate analysis. To determine education-specific correlations, the overall model was calculated once again for the four central correlations, separately for the various education levels. The bi- and multivariate analyses were done in a standardized fashion incorporating full data sets only. All tests were two-tailed and the defined level of significance was $p \leq 0.05$. The analyses were done using the statistical program SAS for Windows, version 9.02 (SAS Institute Inc., Cary, NC, USA).

## Results

Prevalences of exercise, obesity, and selected everyday physical activities

Of the older adult respondents in Baden-Württemberg, 61.7%[4] said they engaged in leisure-time physical activity at least once a week. However, 12.9% of the respondents have a BMI of at least 30, which qualifies them as obese in accordance with the current WHO definition; 47.4% of the respondents ride a bike for transport, and 72.1% of the older adult respondents said they were regular walkers.

Bivariate analyses of exercise and obesity

The bivariate analyses revealed a highly significant positive correlation both between exercise and cycling for transport ($\chi^2$=97.989, $p \leq 0.001$) and between exercise and walking ($\chi^2$=38.171, $p \leq 0.001$).

This positive bivariate correlation between cycling for transport and exercise applies across all educational groups (results not presented in detail here). Bivariate analysis of the correlation between walking and exercise for different

[4] Exercise in the respondents' definition of the term. There was no subsequent data cleaning to exclude exercise types/activities involving very little activity (e.g. bowling).

educational groups shows, however, that a significantly positive relationship between regular walking and leisure-time physical activity applies only to *Hauptschule*[5] graduates ($\chi^2$=37.712, $p\leq$0.001). For *Realschule* graduates and individuals with *Abitur*, regular walking does not have a significant effect on exercise.

In terms of bivariate analysis of the correlation between physical activity and obesity, however, contrary significant correlations are evident. Obese individuals are significantly more likely than non-obese individuals to be regular walkers ($\chi^2$=5.670, $p$=0.017). Separate analysis for the different educational groups shows that this correlation applies only to *Hauptschule* graduates ($\chi^2$=8.401, $p$=0.0037).

Obese subjects are significantly less likely to cycle for transport ($\chi^2$=6.813, $p$=0.009). Bivariate analysis for the different educational groups confirms this significant negative correlation only for *Hauptschule* graduates ($\chi^2$= 9.944, $p$=0.0020).

**Table 1** Effects of everyday bicycle use and going for walks on an everyday basis on current sporting activity, controlled in both models for education, tobacco use, eating habits, overweight, state of health, and diabetes (logistical regression)

| | Current sporting activity | |
|---|---|---|
| | Everyday bicycle use | Going for walks |
| Model | 1 | 2 |
| Cycling[a]/going for walks[a] | | |
| Odds ratio | 2.441* | 1.846* |
| 95% CI | 1.992–2.991 | 1.487–2.292 |
| $R^2$ | 0.1082 | 0.0759 |
| $n$ | 1,805 | 1,805 |

[a] Dichotomous variable coded with 1 in the presence of the characteristic and otherwise coded 0
$n$ number of subjects, *CI* confidence interval
*$p\leq$0.001

## Multivariate analyses

### *Bike riding/regular walking and current exercise*

Logistical regression analysis shows that the significant correlation between bike riding and exercise holds even after controlling for all bivariately significant variables. Subjects who ride a bike for transport are 2.4 times more likely to be exercisers than subjects who do not (Table 1, model 1).

The statistically significant correlation between regular walks and exercise is retained in the bivariate analysis even after controlling for educational attainment. Individuals who walk regularly are 1.8 times more likely to be exercisers than subjects who do not. This correlation continues to apply whilst controlling for the additional lifestyle-relevant variables of tobacco use, nutrition, subjective state of health, obesity, and diabetes (Table 1).

Education-specific analysis reveals a positive correlation between cycling for transport and exercise across all educational attainment strata, whilst controlling for all the variables controlled in the overall model (see Table 2). *Hauptschule* graduates who cycle are 2.7 times more likely to be exercisers than *Hauptschule* graduates who do not. This significant correlation also applied for *Realschule* graduates [odds ratio (OR)=2.306, $p$=0.002] and those with *Abitur* (OR=1.979, $p$=0.004), albeit to a lesser extent (see Table 2).

The logistical regression models calculated separately for the various educational groups show that — when the controlled variables from the prior overall model are held constant — the positive relationship between regular walking and exercise applies only for subjects with lower educational attainment. Subjects with *Hauptschule* graduation, or with no school-leaving qualifications whatsoever, who take regular walks are 2.1 times more likely to be exercisers than *Hauptschule* graduates who do not (see Table 2). No statistically significant relationships are detected for subjects with higher educational attainment (see Table 2).

### *Cycling for transport/regular walking and obesity*

The previously reported negative correlation between cycling for transport and obesity disappears for the overall population when controlled for other relevant variables (Table 3, model 1).

The odds ratio for being obese is 1.5 times higher for regular walkers when controlled for age, education, gender, and other lifestyle factors (Table 3, model 2).

The analyses for the individual educational groups — using the same controlled variables as indicated in Table 3 — showed no significant relationship between cycling for transport and obesity (see Table 4).

Education-specific analysis shows a positive correlation between regular walks and obesity only for *Hauptschule* graduates (Table 4). Regular walkers with low educational attainment are 1.8 times more likely to be obese than *Hauptschule* graduates who do not report regular walking.

[5] The school forms in the three-tiered German secondary school system are *Hauptschule*, *Realschule*, and *Gymnasium* (9, 10, and 12–13 years of education, respectively). *Gymnasium* graduates pass an exam called *Abitur* which qualifies them to enter university, *Hauptschule* and *Realschule* qualifications are vocational rather than academic.

**Table 2** Education-specific analysis of the effects of everyday cycling and of going for walks on an everyday basis on current sporting activity, controlled for tobacco use, eating habits, overweight, subjective state of health, and diabetes (logistical regression)

| | Current sporting activity | | | | | |
|---|---|---|---|---|---|---|
| | Everyday bicycle use | | | Going for walks | | |
| Model | *Hauptschule* 1 | *Realschule* 2 | *Abitur* 3 | *Hauptschule* 4 | *Realschule* 5 | *Abitur* 6 |
| Cycling[a]/going for walks[a] | | | | | | |
| Odds ratio | 2.663* | 2.306** | 1.979** | 2.089* | 1.229 | 1.564 |
| 95% CI | 2.061–3.440 | 1.379–3.857 | 1.238–3.162 | 1.595–2.735 | 0.702–2.154 | 0.936–2.615 |
| $R^2$ | 0.1609 | 0.1365 | 0.0624 | 0.1192 | 0.1036 | 0.0452 |
| *n* | 694 | 539 | 572 | 694 | 539 | 572 |

[a] Dichotomous variable coded 1 in the presence of the characteristic and otherwise coded 0
*n* number of subjects, *CI* confidence interval
*$p \leq 0.001$; ** $p \leq 0.01$

In contrast, a significant correlation between frequent walking and obesity is not evident for *Realschule* graduates or those with *Abitur* qualifications.

## Discussion

Are non-exercisers more physically active in everyday life to compensate for their lack of exercise?

Individuals aged 50–70 years who practice everyday physical activities such as cycling for transport and walking are also likely to take exercise. The significantly positive correlation between bike riding and exercise is evident in all three educational strata. Possibly, cycling for transport is perceived in all three educational strata as being an exercise-like activity and hence as being a component of an active lifestyle.

In contrast, breakdown by educational stratum shows that the positive correlation between walking and exercise applies only among *Hauptschule* graduates. These education-specific differences in the impact of regular walking on exercise may be because individuals with higher educational attainment would be unlikely to go for a simple walk when in need of physical and mental relaxation, opting instead for hiking — which they would classify and report as exercise — or other leisure-time physical activity.

Does everyday physical activity make up for a lack of exercise with respect to the risk factor of obesity?

Individuals who take regular walks are significantly more likely to be obese than those who do not. Possibly, obese individuals choose a gentle walk as a spurious substitute for leisure-time physical activity (to assuage any "guilt" about not taking enough exercise). Broken down by educational attainment level, the walking-obese correlation applies only for *Hauptschule* graduates, however. This may be because a disproportionately high percentage of individuals with lower educational attainment are obese (Sulander and Uutela 2007) and unused to exercise and would perceive walking as non-strenuous. In addition, walking does not require expensive equipment. The lack of a financial barrier is a relevant factor for less well-off individuals with lower educational attainment.

**Table 3** Effects of everyday cycling on overweight, controlled in both models for age, gender, education, tobacco use, subjective state of health, diabetes, cholesterol, hypertension, and current sporting activity (logistical regression)

| | Obesity | |
|---|---|---|
| | Everyday bicycle use | Going for walks |
| Model | 1 | 2 |
| Cycling[a]/going for walks[a] | | |
| Odds ratio | 0.817 | 1.490* |
| 95% CI | 0.592–1.127 | 1.026–2.164 |
| $R^2$ | 0.2453 | 0.2481 |
| *n* | 1,805 | 1,805 |

[a] Dichotomous variable coded 1 in the presence of the characteristic and otherwise coded 0
*n* number of subjects, *CI* confidence interval
*$p \leq 0.05$

Data set method limitations

With respect to the fairly low response rate, it is noteworthy that, although low response rates are generally associated with an increased risk of bias (Porst et al. 2007: 6; Koch 1997; Koch 1998; Schnell 1997), a low response rate does

**Table 4** Education-specific analysis of the effects of everyday cycling and going for walks on an everyday basis on overweight, controlled for age, gender, tobacco use, subjective state of health, diabetes, cholesterol, hypertension, and current sporting activity (logistical regression)

| | Obesity | | | | | |
|---|---|---|---|---|---|---|
| | Everyday bicycle use | | | Going for walks | | |
| Model | *Hauptschule* 1 | *Realschule* 2 | *Abitur* 3 | *Hauptschule* 4 | *Realschule* 5 | *Abitur* 6 |
| Cycling[a]/going for walks[a] | | | | | | |
| Odds ratio | 0.701 | 2.046 | 0.482 | 1.761* | 1.090 | 0.957 |
| 95% CI | 0.480–1.024 | 0.907–4.617 | 0.146–1.591 | 1.132–2.740 | 0.428–2.776 | 0.278–3.293 |
| $R^2$ | 0.3240 | 0.1510 | 0.1386 | 0.3286 | 0.1342 | 0.1254 |
| *n* | 694 | 539 | 572 | 694 | 539 | 572 |

[a] Dichotomous variable coded 1 in the presence of the characteristic and otherwise coded 0
*n* number of subjects, *CI* confidence interval
*$p \leq 0.05$

not always equate with low data quality (Koch 1998; Porst et al. 2007). It is also worth questioning the extent to which a maximized response rate is useful if it involves "forcing" interviewees to respond through the massive deployment of response rate-enhancing measures. If such measures succeed in reducing the response rate but end up skewing the results, their impact may even be counterproductive in terms of survey quality (Porst et al. 2007). Conversely, bias may be low even in the presence of a low response rate, provided that noncoverage is largely random (Koch 1997; Koch 1998; Porst et al. 2007). In the latter case, respondents would differ minimally if at all from nonrespondents and would hence represent no more than a random sample of the initial sample. In such a case, the only consequence of low response would be a larger standard error (Porst et al. 2007: 6). The risk of nonresponse bias exists, however, if noncoverage is not randomly distributed across the target population (Koch 1997; Koch 1998). In summary, it can be stated that response rate is only one attribute among many in determining survey quality (Porst et al. 2007) and the focus on this particular feature is primarily because it can be measured objectively (Porst et al. 2007).

As nonresponse bias is an attribute-specific variable, a low response rate (but also a high response rate) may be associated with marked bias in respect of one attribute, whereas the survey may be relatively bias-free in respect of another attribute (Koch 1998). A major problem in measuring nonresponse bias is that information on differences between respondents and nonrespondents is usually unavailable (Koch 1998).

Because of the nature of the study, the data generated are based on subject self-assessment. Therefore, social desirability bias may be a factor (Lautenschlager and Flaherty 1990). The fairly high percentage of exercisers may be partly attributable to social desirability effects. As past studies show, any investigation of behaviors deemed socially desirable is like to produce reporting bias in favor of the desirable behavior, resulting in this case in overreporting of exercise (Lamprecht and Stamm 1995). However, the potential social desirability problem is offset by the many advantages of the telephone interview method. The first of these is the representativeness of the data for the population studied. Unlike many other studies on the effects of ordinary physical activity on exercise and obesity, this study was not limited to a local, hospital-specific patient population. Although the results are representative for the 50- to 70-year-old Baden-Württemberg population only, the similarity in population structure between Baden-Württemberg and the whole of Germany allows the data to be applied to the overall German population (see Table 5). To illustrate the relevance of the representative dataset for the 50- to 70-year-old Baden-Württemberg population to the overall population of Germany, Table 5 compares key demographics for the 50- to 70-year-old national population with those of the 50- to 70-year-old Baden-Württemberg population. As can be seen, the population structure barely differs overall.

Another advantage of the study procedure is that it enabled us to analyze correlations between exercise, obesity, and physical activity in large sample sizes. Nevertheless, given the cross-sectional data employed, the results cannot be interpreted in terms of causation.

## Conclusion

Given the economic importance of cardiovascular disease and orthopedic conditions such as back pain on the one hand and the reluctance of many middle-aged and older adults to practice leisure-time physical activity regularly on the other hand, targeted encouragement of ordinary physical

**Table 5** Comparison of selected demographics for Baden-Württemberg and the whole of Germany (in %)

| | Baden-Württemberg | Germany |
|---|---|---|
| Age distribution (years of age) | | |
| Under 6 | 4.6[a] | 5.3[b] |
| 6–15 | 10.8[a] | 8.9[b] |
| 15–25 | 11.8[a] | 11.8[b] |
| 25–45 | 29.4[a] | 28.8[b] |
| 45–65 | 25.2[a] | 26.1[b] |
| 65+ | 18.2[a] | 19.3[b] |
| Education | | |
| No qualifications | 3.8[c] | 3.7[d] |
| *Hauptschule* graduates | 48.3[c] | 44.1[d] |
| *Realschule* graduates | 23.9[c] | 28.4[d] |
| *Abitur* (university entrance qualification) | 24.0[c] | 23.8[d] |
| Proportion of women (percentage of total population) | 50.9[e] | 51.1[e] |
| Proportion of nonnationals (percentage of total population) | 12.0[f] | 8.8[f] |
| Marital status | | |
| Unmarried | 42.3[g] | 41.2[b] |
| Married | 45.7[g] | 44.5[b] |
| Divorced/widowed | 12.0[g] | 14.3[b] |
| Size of household (number of persons) | 2.2[a] | 2.1[a] |
| Proportion of smokers (percentage of over-15 population) | 24.5[h] | 27.2[h] |
| Proportion of overweight individuals (body mass index of 25 or higher) | 47.5[h] | 49.6[h] |

[a] State Census Bureau Baden-Württemberg (2006): Results of the Baden-Württemberg Microcensus, Stuttgart
[b] Federal Census Bureau: Population by Age Group, Marital Status and Religion. 24 Aug.2006 http://www.destatis.de/basis/d/bevoe/bevoetab5.php. Cited 4 Jun 2007
[c] State Census Bureau Baden-Württemberg (2006): Results of the Baden-Württemberg Microcensus, Stuttgart
[d] Federal Census Bureau: Educational Attainment. 29 Jun 2006 http://www.destatis.de/basis/d/biwiku/bildab1.php. Cited 4 Jun 2007
[e] State Census Bureau Baden-Württemberg: Proportion of Women in the Population. 30 May 2007 http://www.statistik.baden-wuerttemberg.de/Indikatoren/01_001.asp?BevoelkGebiet. Cited 4 Jun 2007
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[h] Schmidt, Sabine (2006): How healthy are Baden-Württembergers—Results of the Microcensus on Health (in German). Statistisches Monatsheft Baden-Württemberg, 10. pp 6–9

activity is an important health policy objective. Ordinary physical activity such as regular walking/cycling gives broad, low-cost access to exercise.

Campaigns appealing to sectors of the population with disproportionately low exercise participation and presenting physical activity as a means to a healthy lifestyle might be useful. More cycle lanes in cities and leisure areas might encourage more people to cycle for transport. Given the primary care physician's influence in encouraging physical activity (Becker and Schneider 2005; Schneider and Becker 2005), doctors can play a major role in urging people to walk and cycle for transport on health grounds. Other authors report a significant correlation between everyday activity levels and the incidence of risk factors (Hu et al. 2003). For sectors of the population with low exercise participation, including those with low educational attainment levels, leisure-time physical activity offerings should be low-threshold and not require high levels of fitness. They must be inexpensive, easily learned, and allow flexible scheduling; examples would be hiking, swimming, hill walking, and cycling. Abele and Brehm (1990) cite keep fit courses as an ideal introduction to leisure-time physical activity for individuals unused to exercise.

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**Conflict of interest** The authors confirm that there are no relevant associations that might pose a conflict of interest.

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